IN THE UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

GEOLOGIC COMPUTER SYSTEMS, INC., a Michigan corporation,

Plaintiff,

vs.

CATERPILLAR, INC., a Delaware corporation,

Defendant.
_____/

03 74168

Case No. _____
Hon. _____
PAUL D. BORMAN
MAGISTRATE JUDGE PEPE

THE WEINTRAUB GROUP, PLC
By: Arnold S. Weintraub (P22127)
Attorneys for Plaintiff
32000 Northwestern Highway, Suite 240
Farmington Hills, Michigan 48334
Telephone: (248) 855-8888
_____/

DECLARATORY JUDGMENT FOR NON-INFRINGEMENT OF CERTAIN PATENTS

Plaintiff GeoLogic Computer Systems, Inc., through its attorneys, The Weintrau Group, PLC, submits the following as its Complaint for Declaratory Judgment agains Caterpillar, Inc.:

JURISDICTION AND VENUE

1. This action arises under the Federal Declaratory Judgment statute, 2 U.S.C. 2201 et. seq.

2. This is an action arising under the patent laws of the United States namely 35 U.S.C. 271, et seq.

3. An actual dispute and/or controversy exists between the parties.

4. Jurisdiction is proper with this Court pursuant to 28 U.S.C. 1338(a).

5. Venue is proper with this Court pursuant to 28 U.S.C. 1400(b).

THE PARTIES

6. Plaintiff, GeoLogic Computer Systems, Inc. ("GeoLogic") is a Michiga corporation with its principal place of business in Waterford, Michigan. It is in the business c selling, installing, and servicing software products for use in topography including surveyin land grading, excavating, landfills and similar applications.

7. Defendant Caterpillar, Inc. ("Caterpillar"), on information and belief, i a Delaware corporation with its principal place of business in Illinois. Caterpillar is a Fortun 500 company traded on the New York Stock Exchange and is primarily noted for sales of eart moving equipment and Computer Aided Earthmoving System (CAES) therefore includin software.

COMMON FACTUAL ALLEGATIONS

8. Plaintiff realleges each of the preceding paragraphs as if fully state herein.

9. In 1985, one of GeoLogic's founders, Mark Williams, came up with th idea of using a device comprising of an on-board computer to calculate and displa topographical coordinates. The device as conceived would be used for rapid surveyin whereby the actual site plans would be digitally brought into the field to allow stakes to be se from the plans directly, as opposed to from a data recorder or notebook, or control an eart grading machine to eliminate the need for stakes. Mark discussed and started work on th concept with Charles and John Julian.

10. In 1987, while attending a family reunion, Mark Williams discussed hi idea with his cousin Alan Williams, who was then employed as a software engineer.

11. Alan Williams became interested in the concept and he was able to writ and develop a program that would locate X-Y-Z coordinates (i.e. horizontal and vertica positioning) for any particular point at a site and indicate the proper topographical or groun position or elevation for that certain point. When used for road grading, the measured positio of the road grader is compared with the proposed contour points of the road surface, and a

output signal is generated, indicating the direction and grade correction necessary to bring th road grader into proper position. The signal generated by the prototype could be transmitted t a human operator by means of visual representation on a computer screen, indicator light indicator sounds, or voice synthesizer that converted the computer signals to voice instruction Alternatively, the correctional signals could be transmitted to a remotely controlled device i the road grader that automatically corrected the steering and road grader blade position t achieve the desired correction. The primary benefit and purpose of this device is that it cut down on the amount of man-hours that must be spent on traditional surveying activities on material grading type construction project and greatly reduces the amount of rework due t operator error in interpreting stakes thus controls and reduces costs.

12. From this development, Mark Williams and Alan Williams were able t manufacture a working prototype of their device for controlling the position of an earth grader

13. On or about March 29, 1990, Mark Williams and Alan William submitted a Patent Application concerning their Method and Apparatus for Controlling Eart Grader Position. (See Exhibit "A.")

14. The device Mark and Alan Williams invented, and as described in th patent application, uses, *inter alia*, global positioning satellites independently or in conjunctio with any other position sensing instrumentation, including potentially using at least on instrument positioned in a stationary position to provide a correction vector. The device coul

also be a device to optically or electronically sense the position of a mobile sensor and thus th mobile device.

15. Over the years, in addition to grading roads and doing site work, Mar Williams and Alan Williams identified other potential uses for their invention, includin determining topographical and geological characteristics of land for agricultural and, at th request of MDOT, for constructing, compacting and closing landfills.

16. On or about February, 1990, Mark Williams discussed the inventio with Jerry Frost, the owner of a Michigan Caterpillar distributorship, namely Michigan Cat.

17. Thereafter, and in order to obtain assistance in bringing their concept t the marketplace, on or about March, 1990, Mark Williams and Alan Williams approache Caterpillar, through Jerry Frost, seeking assistance with capital, engineering application an purchasing. They demonstrated their device and explained their technology in depth to Fran Moberly, a Caterpillar Tractor representative and himself an inventor, at that time the William believed their patent application would protect their invention. Caterpillar declined to enter int any business relationship with the Williams.

18. After the meeting identified in Paragraphs 16 and 17, above, Caterpill began filing multiple patent applications attempting to patent devices, and method substantially similar to or derived from that of the Williams' invention. Among the patent Caterpillar obtained concerning this technology are, inter alia,

U.S. Patent No. 6,047,227

U.S. Patent No. 5,631,658

U.S. Patent No. 5,801,967

U.S. Patent No. 5,275,663

U.S. Patent No. 5,808,907

U.S. Patent No. 5,646,844

U.S. Patent No. 6,073,068

U.S. Patent No. 5,735,352

U.S. Patent No. 5,612,864

U.S. Patent No. 5,925,085

U.S. Patent No. 5,764,511

U.S. Patent No. 5,935,192

U.S. Patent No. 5,493,494

U.S. Patent No. 5,471,391

U.S. Patent No. 6,112,143

19. Currently, Caterpillar markets and promotes a Computer Aide Earthmoving System (CAES) for landfills. Caterpillar claims that the CAES uses globa positioning satellite technology to, among other uses, improve grade/slope control.

20. Caterpillar claims that its CAES "shows the operator where they *(sic* are and where they *(sic)* need to be in relation to the site plan. This eliminates the need fc grade stakes and vertical markers which are vulnerable to being lost or knocked down. Overa

CAES greatly improves grade/slope application by providing information to the operator tha was never before available." (See Exhibit "B").

21. Although it is clear that the Caterpillar CAES system is derived from th Williams' technology, there are differences that preclude any question of infringement of an of the claims of the asserted patents. The Williams' device measures the difference in elevatio between each compacting pass and reports the deflection or difference between eac successive pass. The operator stops compacting when he or she determines that the level o deflection is to his satisfaction, i.e. when there is little or no difference between this pass an the last pass, and, therefore, the land is compacted. Caterpillar's device creates a model whic determines that based upon the thickness of the material added, a calculated amount o displacement must be made over the material to achieve proper compaction. In other words th material is not compacted until the difference between the first surface and the second surfac has been achieved. If the material will not compact, the Caterpillar system will continue t show the ground as an area that needs compaction. The Williams' device assumes that strengt and density of material brought into the landfill is highly variable whereas the Caterpilla device assumes that it is uniform. The Williams' device allows the operator to see tha sometimes it is not useful to roll some materials more than once of twice, whereas othe materials need to be rolled many times. The Caterpillar device tells the operator to roll a materials as if they were the same because it is based on the concept of using a model that say that all material coming into a landfill should be treated the same.

22. For certain applications of GeoLogic and Caterpillar's software product and specifically for landfill compaction, the companies are competitors, directly competing fo specific customers.

23. On or about July 9, 2003, Caterpillar contacted GeoLogic and informe GeoLogic that it was infringing on Caterpillar's patents. (See Exhibit "C"). Caterpillar als offered to sell to GeoLogic a license for GeoLogic to market its own technology. Howeve when asked about the terms of the license, Caterpillar indicated that it did not have an particular terms in mind since it was not expecting any inquiry regarding a license fron Plaintiff.

24. Substantially contemporaneously with the letter of Exhibit "C," an based upon information and belief, representatives of Caterpillar have made statements t potential customers of GeoLogic that Caterpillar would "crush" GeoLogic.

25. In a telephone conversation between counsel for Caterpillar and counse for GeoLogic, Caterpillar would not affirm that it would not commence a lawsuit over thi instant dispute.

26. Based upon information and belief, Caterpillar will imminentl commence an action against GeoLogic alleging that GeoLogic has infringed upon one or mor of the Caterpillar patents identified above.

COUNT I

DECLARATORY JUDGMENT OF NON-INFRINGEMENT

27. Plaintiff realleges each of the preceding paragraphs as if fully state herein.

28. Essential portions of the systems developed by Plaintiff have bee publicly disclosed, offered for sale and demonstrated continuously since at least 1989.

29. The patent application of Exhibit "A" discloses essentially all of th parameters of GeoLogic's present products.

30. In addition, it is clear from a comparison of the subject matter of th views shown in the Exhibit "A" and those of the Caterpillar patents that there is no similarit between the methods employed therein, i.e. measuring deflection versus comparison to model.

31. Because of the differences it is clear that not one claim of any Caterpilla patent can be read on GeoLogic's technology, and, therefore, there is no infringement.

32. Unless this court declares the GeoLogic products not to be infringed b Caterpillar's patents, Caterpillar will continue to assert its patents in the industry thereb imposing irreparable harm upon GeoLogic.

COUNT II

PATENT MISUSE

33. Plaintiff realleges each of the preceding paragraphs as if fully state herein.

34. The Caterpillar Patent No. '352 is invalid and unenforceable because o fraud and/or inequitable conduct practiced by Caterpillar during the prosecution of the patent The particulars of this activity are as follows:

(a) Assuming arguendo that Caterpillar is asserting the '352 patent as bein infringed by the GeoLogic software, then it is clear that Caterpillar more than one year prior t the time of filing of the application which lead to the issuance of the '352 patent, knew of an had intimate knowledge of the Williams' invention; and

(b) Further, the patents held by Caterpillar are invalid and/or unenforceabl because the claimed inventions thereof fail to satisfy the conditions for patentability specifie in Title 35, Part II, USC, including, without limitation, Sections 101, 102, 103 and/or 112 Specifically, the inventions disclosed and claimed in the '352 patent were known or used b others i.e. the Williams long before any invention by Caterpillar and/or they were not invente by Caterpillar personnel, at least as to the '352 patent.

37. Caterpillar knew that the software that was disclosed and offered for sale by the Williams's in 1991 was material to the examination of the '352 patent within the meaning o 37 CFR §1.56. Caterpillar did not notify the patent examiner of this prior art, thereby rendering the '352 patent and its progeny unenforceable. Furthermore, each invention in the othe Caterpillar patents are unpatentable as an obvious modification of the Williams' invention.

38. Unless this Court declares the Caterpillar patents invalid or unenforceable Caterpillar will continue to inflict irreparable harm and injury upon GeoLogic through it repeated assertions of patent infringement, upon information and belief, directly to GeoLogic' customers.

39. GeoLogic has no adequate remedy at law.

COUNT III

UNFAIR COMPETITION – 15 U.S.C. §1125(a)

40. Plaintiff realleges each of the preceding paragraphs as if fully stated

41. Caterpillar, through its employees knowing that its patents are either invalid for the reasons set forth hereinabove or that the GeoLogic system does not infringe th patent, has undertaken a predatory practice of threatening GeoLogic's potential customers wit threats of "crushing" GeoLogic if the customers were to purchase the GeoLogic software.

42. Caterpillar has undertaken this predatory practice of threatening to sue ir order to maintain its monopoly position in the landfill market for GPS controlled earth moving equipment by means other than competition on the merits.

43. Upon information and belief, Caterpillar has undertaken this course o conduct deliberately to impede and continue to deliberately impede GeoLogic's efforts to sell it software system by advising potential customers that GeoLogic will be unable to supply and support its systems and devised because it will be "crushed."

COUNT IV

WALKER PROCESS FRAUD IN VIOLATION OF SHERMAN ACT §2

44. Plaintiff realleges each of the preceding paragraphs as if fully stated herein.

45. As indicated above, during the prosecution of the '352 patent, Caterpilla never informed the PTO of its knowledge of the Williams' invention which was incorporate substantially into the Caterpillar '352 patent. That information was material to the applicatio and Caterpillar knowingly and intentionally, with the intent to deceive the United States Paten and Trademark Office, failed to properly disclose same and thereby obtained the '352 patent b fraud which patent otherwise would not have issued.

46. Upon information and belief, Caterpillar with full knowledge that its '35 patent is invalid and unenforceable because of its pre-filing activities, knowledge and it

fraudulent concealment from the PTO of that information as described above, has deliberately impeded, and continues to impede, GeoLogic's efforts to sell its software by (a) threatening to bring and maintain a baseless action against GeoLogic; and (b) upon information and belief publicizing threatened action to actual and potential customers.

47. Caterpillar has engaged in this action to monopolize and has monopolized the GPS-controlled earth moving equipment business, and it has done so for the purpose of eliminating GeoLogic from effectively competing in the market.

48. Caterpillar's conduct constitutes unlawful monopolization of, or unlawful attempted monopolization of the landfill compaction market in violation of the Sherman Act, 15 USC §2.

49. Caterpillar's fraudulent actions and actions as alleged above, have led to the false conclusion that the '352 patent is valid when it is not valid at all and has caused GeoLogic to incur large expenditures in the defense of Caterpillar's actions and to suffer economic losses in the market.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff requests for judgment in its favor against Caterpillar Inc. and grant the following relief on GeoLogic Computer Systems Inc.'s claims that:

A. The Court declare that Caterpillar, Inc. has violated the Sherman Act, 1
USC §2;

B. The Court declare that Caterpillar, Inc. has competed unfairly in violatio
of Title 15 USC 1125(a);

C. The Court award GeoLogic Computer System, Inc. its costs and attorne
fees incurred in this action and trebling them pursuant to the Clayton Ac
§4 or, alternative, if not trebled, award GeoLogic its costs for bringing thi
action pursuant to 35 USC §285;

D. The Court award GeoLogic its actual damages for other injuries to it
business and properties suffered by reason of Caterpillar's violation of th
Anti-Trust laws, plus interest, and GeoLogic's costs incurred i
connection with this claim, as provided in The Clayton Act §4, 15 USC
§15;

E. The Court preliminarily and permanently enjoin Caterpillar, Inc., it
officers, agents, directors, servants, employees, subsidiaries and assigns
and all those acting under the authority of, or in privity with them or an
of them, and all those in active participation or with any of them wh
receive actual notice of any injunction from asserting or otherwise seekin

to enforce the '352 patents enumerated above, or threatening litigation respecting same;

F. The Court declare invalid and unenforceable the following United States Letters Patent Nos.:

U.S. Patent No. 6,047,227

U.S. Patent No. 5,631,658

U.S. Patent No. 5,801,967

U.S. Patent No. 5,275,663

U.S. Patent No. 5,808,907

U.S. Patent No. 5,646,844

U.S. Patent No. 6,073,068

U.S. Patent No. 5,735,352

U.S. Patent No. 5,612,864

U.S. Patent No. 5,925,085

U.S. Patent No. 5,764,511

U.S. Patent No. 5,935,192

U.S. Patent No. 5,493,494

U.S. Patent No. 5,471,391

U.S. Patent No. 6,112,143

G. The Court grant such other relief as the Court deems just and equitable as permitted by 28 USC §2202, Title 35 and Title 15.

Respectfully Submitted,

Arnold S. Weintraub (P 22127)
Attorney for Plaintiff
The Weintraub Group, PLC
32000 Northwestern Highway, Suite 240
Farmington Hills, MI 48334
(248) 865-9430

Dated: October 13, 2003

IN THE UNITED STATES DISTRICT COURT

EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

GEOLOGIC COMPUTER SYSTEMS, INC., a Michigan corporation,

Plaintiff,

vs.

CATERPILLAR, INC., a Delaware corporation,

Defendant.

03-7416
Case No. PAUL D. BORMAN
Hon. _____

MAGISTRATE JUDGE P

THE WEINTRAUB GROUP, PLLC
By: Arnold S. Weintraub (P22127)
Attorneys for Plaintiff
32000 Northwestern Highway, Suite 240
Farmington Hills, Michigan 48334
Telephone: (248) 855-8888

FILED

JURY DEMAND

Plaintiff, through undersigned counsel, demands a trial by jury on all issue above-captioned matter.

Respectfully Submitted,

Arnold S. Weintraub (P22127)
Attorney for Plaintiff
The Weintraub Group, PLC
32000 Northwestern Highway, Suite
Farmington Hills, MI 48334
(248) 865-9430

Dated: October 13, 2003

OMB No. 0651-0011 (12/31/86)

Applicant or Patentee: Mark A. Williams; Alan R. Williams
Serial or Patent No.: _____
Filed or Issued: _____
For: METHOD AND APPARATUS FOR CONTROLLING EARTH GRADER POSITION

Attorney's Docket No.: WI 1.2

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS (37 CFR 1.9 (f) and 1.27 (b)) — INDEPENDENT INVENTOR

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9 (c) for purposes of paying reduced fees under section 41 (a) and (b) of Title 35, United States Code, to the Patent and Trademark Office with regard to the invention entitled METHOD AND APPARATUS FOR CONTROLLING EARTH GRADER POSITION described in

[XX] the specification filed herewith
[ ] application serial no. _____, filed _____.
[ ] patent no. _____, issued _____.

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 CFR 1.9 (c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9 (d) or a nonprofit organization under 37 CFR 1.9 (e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

[XX] no such person, concern, or organization
[ ] persons, concerns or organizations listed below*

*NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

FULL NAME _____
ADDRESS _____
[ ] INDIVIDUAL [ ] SMALL BUSINESS CONCERN [ ] NONPROFIT ORGANIZATION

FULL NAME _____
ADDRESS _____
[ ] INDIVIDUAL [ ] SMALL BUSINESS CONCERN [ ] NONPROFIT ORGANIZATION

FULL NAME _____
ADDRESS _____
[ ] INDIVIDUAL [ ] SMALL BUSINESS CONCERN [ ] NONPROFIT ORGANIZATION

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28 (b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF INVENTOR	NAME OF INVENTOR	NAME OF INVENTOR
Mark A. Williams	Alan R. Williams	
X Mark A. Williams	X Alan R. Williams	
Signature of Inventor	Signature of Inventor	Signature of Inventor
X 03/29/90	X 03/29/90	
Date	Date	Date

Form PTO-FB-A410 (8-83)

-STATE LEGAL®

EXHIBIT

A

DECLARATION FOR PATENT APPLICATION

Docket No. WI 1.2

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled METHOD AND APPARATUS FOR CONTROLLING EARTH GRADER POSITION, the specification of which

(check one) ☒ is attached hereto.
☐ was filed on _____ as
Application Serial No. _____
and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)			Priority Claimed	
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No
(Number)	(Country)	(Day/Month/Year Filed)	Yes	No

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.)	(Filing Date)	(Status—patented, pending, abandoned)
(Application Serial No.)	(Filing Date)	(Status—patented, pending, abandoned)

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

John A. Waters (Reg. No. 24,802); Glenn B. Morse (Reg. No. 15,878)

Address all telephone calls to John A. Waters at telephone no. 616-458-7535.

Address all correspondence to John A. Waters
WATERS, MORSE & HARRINGTON, P.C.
940 Calder Plaza Building
Grand Rapids, Michigan 49503

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first inventor: Mark A. Williams

X Inventor's signature Mark A. Williams X Date 03/29/90

Residence 289 Main Street Citizenship U.S.A.

Post Office Address 289 Main Street
Saranac, Michigan 48881

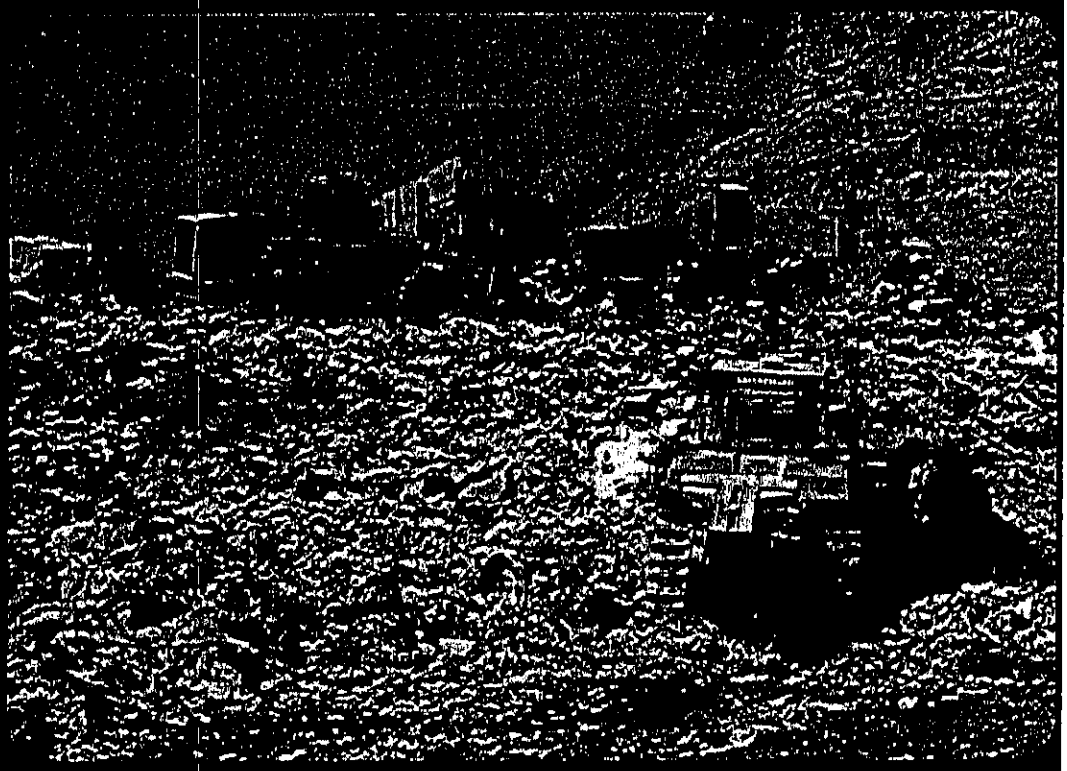
Full name of second joint inventor, if any Alan R. Williams

X Second Inventor's signature Alan R. Williams X Date 03/29/90

Residence 1910 Coronada Citizenship U.S.A.

Post Office Address 1910 Coronada
Ann Arbor, Michigan 48103

Caterpillar's Computer Aided Earthmoving System
Overview for Landfills



CAES

...Technology Solutions for the Waste Industry

Table of Contents

INTRODUCTION

Information age technology products allow many industries to improve productivity, efficiency, and process control. Caterpillar's Computer Aided Earthmoving System (CAES) brings the information age and its benefits to the landfill industry.

CAES enables the re-engineering of the entire site planning and production process. With CAES the operator moves from relying on survey stakes and flags to define the work area to having an electronic plan in the machine cab.

Landfills utilize CAES on compactors and track-type tractors. Compactors ensure proper waste placement and optimum compaction. When CAES is installed on a compactor, the system indicates to the operator how many passes the compactor has made over the material along with grade and slope information. It provides feedback that tells the operator when effective compaction has been achieved. In a track-type tractor application, operators receive real-time grade/slope information to better utilize cover soil and minimize airspace consumption. With the information CAES provides to a track-type tractor, operators work more efficiently with the site plan to reduce costs.

Additionally, CAES permits the identification of site specific storage areas such as hazardous waste, medical, industrial, organic, and other materials which require special handling or a record of their placement.

PROCESS CHANGE

With traditional earthmoving and mining methods, a working site plan is typically created by the engineer in the office on a computer. This information is then transferred to paper, and the surveyor goes out and stakes the area translating it into survey flags and color tape that define elevation, grade, slope, or material type. Once the machine operator has completed the job, the surveyor resurveys the area and updates the office plan. This process is labor intensive and is prone to a check, rework, recheck approach.

CAES streamlines and potentially eliminates the need for these processes, allowing operators to work quicker and more efficiently, increasing the productivity of the operation.

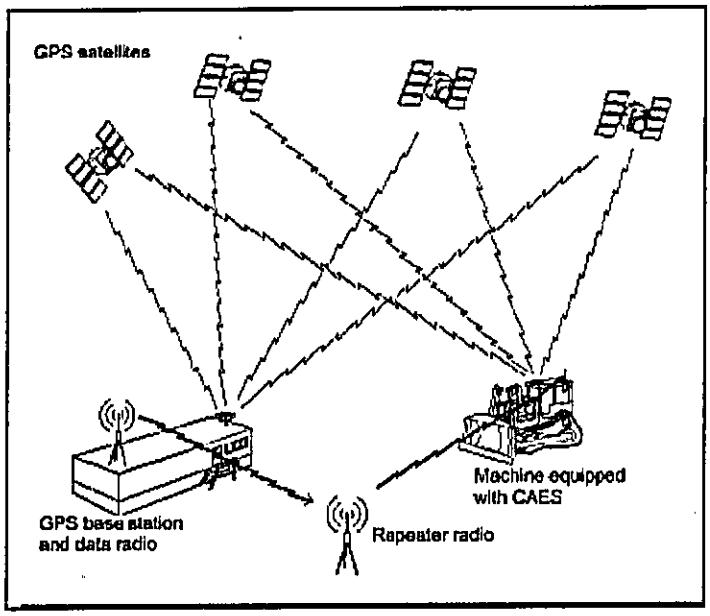


Figure 1. Overview of the system

CAES

Caterpillar's Computer Aided Earthmoving System uses GPS satellite technology and a wireless radio network to aid in a more efficient and productive landfill operation. CAES consists of an on-board system, GPS and wireless infrastructure, and system management software.

As machines are working on site, the topography is changing. CAES equipped machines use GPS navigation to monitor the machines position in the field. CAES sends a record of changes in topography back to the office over a 900 MHz spread spectrum radio network shown in Figure 1. The machines in the field become full time surveyors. These changes update a site digital terrain model that can be utilized by engineering. This allows for a near real-time representation of the landfill topography. CAES also gives the landfill managers and engineers the ability to send design files from the office to the machines over the radio network. Using the radio network and office software, landfill managers have the ability to track the productivity and location of the CAES equipped machines.

CAES can be installed on a Track-type tractor, Compactor, Wheel Loader, Scraper or a Motor Grader. The system gives the operator the ability to control grade using a cab mounted color display with graphical representation of compaction passes and lift thickness.

CAES On-Machine System

A. TC900B - 900MHz communications radio
B. L1/L2 GPS Antenna with built in ground plane
C. GPS Receiver
D. CAES daylight visible display and computer system with Caterpillar® application software

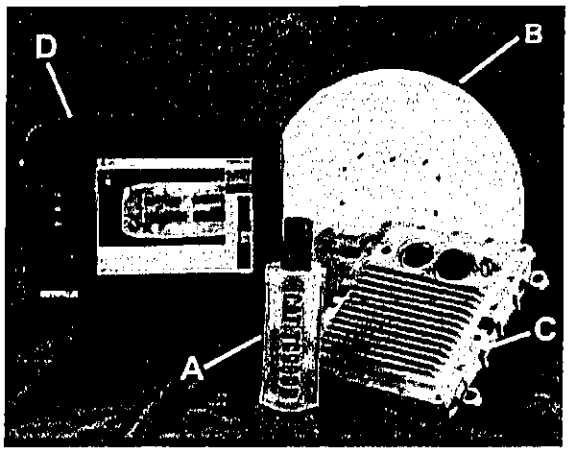


Figure 2. CAES hardware components

Infrastructure

GPS Infrastructure consists of a reference station and a radio network. A GPS reference station is used to achieve the centimeter level accuracy needed in a landfill application. The reference station receives the same GPS signals as the machine receiver, but because they are at separate locations, there is a slight difference in the time these signals are received. The reference station sends its GPS information over a radio link to the CAES enabled machine. The receiver on the machine then combines the information with its own observations to compute precise positioning. The 900 MHZ radio network for CAES has two channels. GPS correction data is transmitted over one channel while the other channel is used for sending site planning and production data to and from the site office and the machines working on-site. This is a spread spectrum radio network that operates at 902-928 MHZ. A signal broadcasts data up to 3.6 miles (6 Km) with line of site under optimal working conditions. By utilizing the same radio as a repeater the range can be extended to provide seamless coverage around local obstacles such as large buildings or hills. Up to four radio repeaters may be used to provide extended coverage.

System Management Software

METSmanager

METSmanager is the software component that allows for integration of the site planning system and the machine providing both plan file conversion and wireless communication.

Key Functionality

- Read design files in standard DXF formats
- Convert the .DXF files to CAES on-board format (.CAT) files
- Send design files to the machine over the radio network
- Produce diagnostic and productivity reports
- Send several designs to the machine to be activated at a later date.

A. File Window

The file window is very similar to a Windows Explorer window. It displays the folder that contains .DXF design files created using the site planning package. It can also hold application configuration files for the GPS receivers and files already converted from .DXF to the CAES on-board software format (.CAT files).

B. Machines Window

The machines window contains icons, one for each machine equipped with CAES on-board software. In the figure shown there are three machines in the METSmanager system. This will allow for multiple machines to be monitored at the same time.

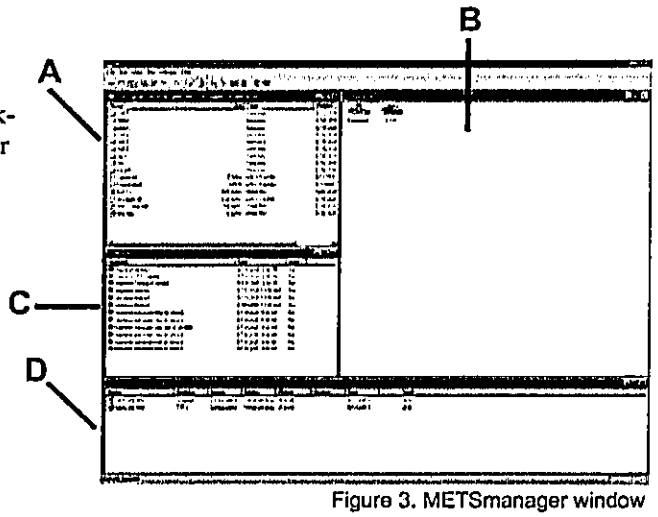


Figure 3. METSmanager window

C. Messages Window

The messages window contains a list of recent messages that METSmanager has generated. A green circle indicates that the site engineer in the office has acknowledged receipt of the message and taken appropriate action. A red, square symbol indicates that this is a new message. Messages displayed can be errors, warnings, confirmations, or information messages.

D. Communications Queue Window

The communications queue window contains a list of all transmissions scheduled to occur over the radio network. This window displays the status of the transmission of files.

CAESoffice

CAESoffice allows staff to monitor the CAES machines throughout the site in near real-time. Figure 4 shows a sample CAESoffice screen with two machines working at the same time. This function allows for better communication between the office and machine operators, resulting in less re-work.

Figure 4. View of compactor and track-type tractor screen in CAESoffice.

Office PC Requirements

- Pentium II/III processor with recommend 128MB memory
- 21" monitor (SVGA color 1024 x 768 resolution) with 2MB video memory
- Windows NT 4.0 or higher with latest service pack
- FAT 16 file allocation system
- Modem- internal or external (required for remote support)
- Required ports: serial (suggest 2 serial, 1 parallel)
- CD ROM drive
- 3.5" disk drive
- Mouse or suitable pointing device
- Minimum of 200 MB hard drive space available

Landfill Planning Software

The re-engineering of the site planning and surveying process begins with the landfill's planning software. Customers use many different CAD-type planning software packages. CAES is compatible with nearly all of these third party vendor products.

The interface specification in the METSmanager manual details the data formats used between the CAES software and the planning software. The data formats are .DXF and ASCII, both industry standard and widely used.

APPLICATIONS

COMPACTION

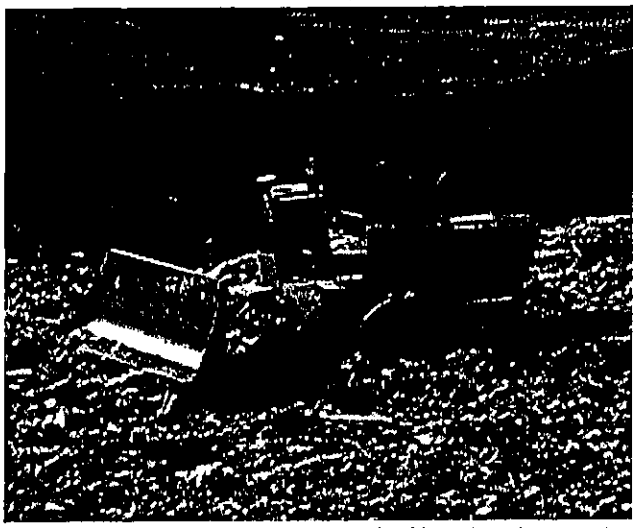


Figure 5. CAES equipped compactor

Airspace is a valuable commodity in landfills. With the use of compactors, sites are able to maximize airspace utilization. Caterpillar's Computer Aided Earthmoving System (CAES) allows landfills to enhance this utilization by enabling operators to have compaction pass and thick lift information graphically displayed in the machine cab.

The plan view window displays a "bird's eye" view of the machine and its work area. For a compactor, this window shows a grid-like area. The color of each grid represents the number of passes the compactor has made across that area. Each time the compactor wheel travels over a surface, the CAES screen changes color to acknowledge the compaction pass. Red indicates a new trash lift, magenta the first full machine pass, yellow the second, dark green the third, and optimum compaction is indicated by light green. This allows the operator to achieve maximum effective compaction, eliminating the possibility of having missed or too lightly compacted areas. CAES also increases compactor productivity by indicating finished areas, reducing un-needed compactor passes.

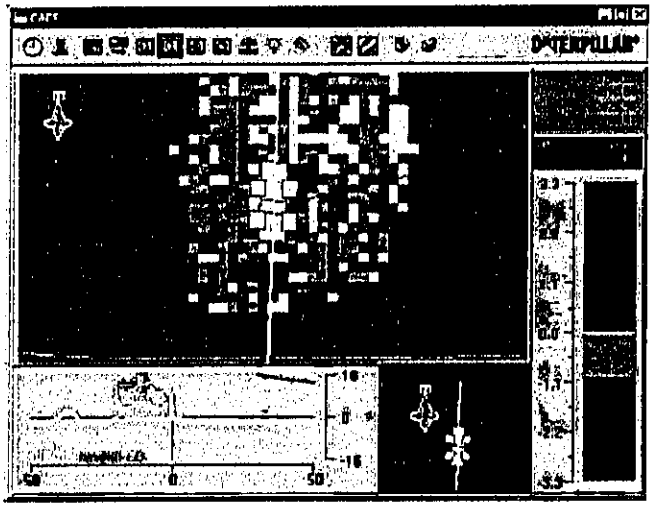


Figure 6. CAES Compactor screen

Thick lift control helps achieve higher compaction densities by managing the depth at which waste is placed. CAES gives thick lift information to the operator by displaying white boxes in the compaction window telling the operator that too much has been placed in that area.

A test run at a midwest landfill showed a 14% increase in compaction from 1150 lb/cubic yard to almost 1400 lb/cubic yard (682 kg/cubic meter to 831 kg/cubic meter). This resulted in $1500.00/day in airspace savings, increasing the life of the landfill. Landfill personnel obtain these compaction numbers by using data sent from the CAES equipped landfill compactor. Topographical information is collected in the office via the wireless radio network on a daily basis. Using CAD software, engineers are able to compare daily, weekly, or monthly topographical data to get volume of airspace consumed. Density of material is calculated by dividing the amount of waste weighed at the site scale by the volume of airspace consumed. CAES provides landfills the chance to use this information to measure their effectiveness at placing and compacting waste.

IMPROVING GRADE/SLOPE CONTROL

Most landfills today create grade and slope designs using design software.The typical process involves site surveyors marking the active areas with grade stakes and vertical markers to represent proper grade/slope to the operators. Once these are in place the machine go to work. Operator interpretation, lost stakes, and inclement weather often mean less than satisfactory results versus the plan. But often this is not determined until after the work is done and a survey check takes place. Rework to correct errors and complete the plan is then needed leading to higher costs and lower efficiency.

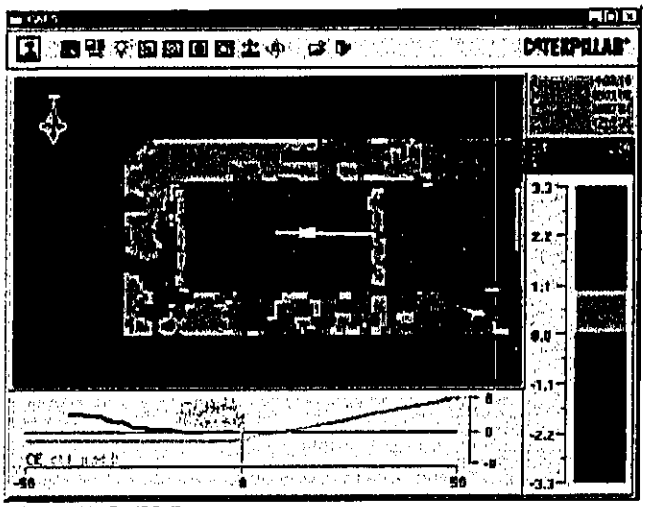


Figure 7. CAES Dozer screen

CAES eliminates these issues by allowing design information to be sent to the CAES enabled machine, empowering operators to work to proper design grade the first time. Figure 7 shows the machine in-cab display. The design box indicates the work to be done, green being the design grade, red indicating the current elevation, and blue the area to be filled. As the current elevation line gets closer to grade, the operator uses the cut/fill indicator on the right for increased accuracy. CAES shows the operator where they are and where they need to be in relation to the site plan. This eliminates the need for grade stakes and vertical markers which are vulnerable to being lost or knocked down. Overall CAES greatly improves grade/slope application by providing information to the operator that was never before available.

ENGINEERING/SURVEY

Landfills survey on a regular basis to determine airspace consumption and grade and slope information. Due to the time frame between surveys, work that is out of specification sometimes is not determined until well after the fact. With CAES, landfills can receive survey information as often as they would like because CAES enabled machines are full time survey tools constantly relaying survey data to the office via the wireless radio network. The landfill engineers process data from the CAES enabled equipment to get topographical information. Design software is used to better follow the trash placement in the active lift areas. More detailed site plans are downloaded to the equipment using the same radio network. Operators are able to use these plans to work within inches of the grade plan the first time. This feature allows landfill engineers to better follow the airspace usage, daily cell construction, and conformance to the plan. One CAES user reports eliminating 6 to 8 hours of surveying per week along with all grade staking in the active area. CAES results in a more efficient and effective engineering/ survey process, saving time and money, and improving planning and landfill operation quality.

COVER SOIL CONSERVATION

Another area of high cost that entails a process difficult to control for many landfills is cover material placement. CAES gives landfills the ability to control cover soil by providing operators with real-time centimeter level design, grade, and slope information. Efficient cover soil management means both a reduction of daily cover soil and more effective utilization of airspace. To prove this point, a trial installation was conducted at a west coast landfill. In this application track-type tractors and landfill compactors worked together toward a designated trash grade. Once this trash grade was met the operator switched to the design plan indicating optimal cover soil depth. After three weeks of trash placement, potholes were dug to measure the difference in cover soil depths. Results show a 40% decrease (from 6"-24" to 7"-9" uniform; 15.2cm-60.9cm to 17.7-22.8cm) in the use of daily cover soil, which is equivalent to 150 yd^3 of airspace per day. For this customer with a tight soil inventory, CAES savings amounted to thousands of dollars per week.

Figure 8. CAES equipped dozer applying cover soil

EMPLOYEE EMPOWERMENT & SAFETY

CAES not only improves the effectiveness of the landfill but also the safety and quality of work for everyone on site. Daily surveys, site stakes, and vertical grade markers for the active areas are no longer necessary, eliminating the need for surveyors or laborers to be in hazardous areas. The CAES in-cab display shows the site plan in real-time assisting the operator in placing waste to grade the first time. This decreases the amount of rework, some user's report up to 90%. CAES also improves operator morale by providing them with the confidence that the work is finished properly, reducing the stress caused by rework. In addition, CAES provides the capability to identify and record specific storage areas for dangerous materials such as hazardous waste, medical and organic materials which require special handling and better documentation of their location in the landfill. Using the on-board display, operators have the ability to accurately record northing, easting, and elevation of any delivered waste. This information is radioed into the office via a two way radio and is then entered into the engineering software. Overall CAES means a safer work environment.

SUMMARY

Today's competitive landfill business environment requires operations to maximize compaction, improve airspace utilization, and the use of cover soil to keep costs down and improve profits. CAES brings the information age to the landfill industry and helps meet these requirements. Through better and more accurate information, the operator works more efficiently and productively. Office software allows landfill engineers to integrate with CAD software seamlessly to design and follow the airspace utilization of the landfill. Time consuming and hazardous surveys and staking grade markers, can be virtually eliminated by using the CAES system. The end results are longer landfill life, lower operating costs, empowered employees and greater productivity.

For more information, please contact:

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July 9, 2003

Mr. Charles Julian, President
GeoLogic Computer Systems
2505 Williams Dr.
Waterford, MI 48328

Dear Mr. Julian:

Caterpillar has invested significant time and money developing various technologies related to the application of three-dimensional positioning systems to earth moving machinery. I would like to call your attention to U.S. Patent Nos. 6,047,227; 5,631,658; 5,801,967; 5,275,663; 5,808,907; 5,646,844; 6,073,068; 5,735,352; 5,612,864; 5,925,085; 5,764,511; 5,935,192; 5,493,494; 5,471,391; and 6,112,143 (copies of which are enclosed for your convenience) that cover important advances in those technologies. In light of the information on your website (www.geologiccomputersystems.com) relating to your GeoSite Manager System and its related modules, it appears that the GeoSite Manager System product may rely on technology related to these patents.

Please review these patents in view of your GeoSite Manager System and its related modules. Caterpillar would consider licensing these patents to you under appropriate terms and conditions. Please contact Ron Scott, one of Caterpillar's Technology Licensing Managers, at (309) 675-6008 at your convenience to set up a meeting to discuss appropriate license terms. If you conclude that your GeoSite Manager System does not require a license, I would appreciate it if you would explain your rationale for reaching that conclusion.

Thank you in advance for your careful consideration of this issue.

Very truly yours,

Clifton G. Green
Intellectual Property Attorney
Caterpillar Inc.
Telephone: (309) 675-6528
Facsimile: (309) 675-1236

cc: Ron Scott, Chuck Schaidle
Enclosures
CGG:jem